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⑮ 発明の名称 壁パネル

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## 明 細 書

## 1. 発明の名称

壁パネル

## 2. 特許請求の範囲

内向き溝形の面材嵌合部が側面全周に設けられたパネル枠と、前記面材嵌合部に周縁が嵌合した構造用面材とを備えた壁パネル。

## 3. 発明の詳細な説明

〔技術分野〕

この発明は耐力壁となる壁パネルに関するものである。

〔背景技術〕

従来、耐力壁パネルとして、鋼製のパネル枠に木製の構造用面材を張ったものが生産されている。しかし、面材とパネル枠との接合部が弱く、この部分の耐力で耐力壁の面内せん断耐力が決定されてしまう。その結果、パネル枠または面材の最大耐力に達しないうちに破壊し、材料の利用効率が低いという問題があった。

〔発明の目的〕

この発明は、材料の利用効率を上げ、面内せん断耐力を向上させることのできる壁パネルを提供することを目的とする。

〔発明の開示〕

この発明の壁パネルは、パネル枠の側面に内向き溝形の面材嵌合部を設け、これに面材の周縁を嵌合させたものである。

この発明の一実施例を第1図ないし第6図に示す。図において、1は鋼製のパネル枠であり、一对の端部縦枠2と上枠3と下枠4とで矩形に枠組みされ、中間に面材嵌合部用縦枠5が設けられている。端部縦枠2は、内向き溝形の本体部分2aと、そのフランジの外面に重なって設けられた内向き溝形の面材嵌合部2bとでなる。本体部分2aと面材嵌合部2bとは重なり合ったフランジの先端で一体に連続して形成されている。面材嵌合部用縦枠5は、溝形の本体部分5aと、そのフランジ外面に重なって本体部分5aと同じ向きに一体に設けられた浅い面材嵌合部5bとでなり、面材嵌合部5bと背合わせに、他の面材嵌合部となる

別体の面材接合部用補助枠6が付設されている。上枠3は下向き溝形に形成され、その側面に面材嵌合部となる上枠用補助枠7が付設されている。下枠4は端部縦枠2と同様に本体部分4aと面材嵌合部4bとからなる。

面材8は木製の構造用面材であり、周縁が各面材嵌合部2b, 4b, 5b、上枠用補助枠7、および面材接合部用補助枠6に嵌合され、これらの上からタッピンねじ20で各枠2~5に固定される。

組立順序を説明する。まず、面材接合部用補助枠6を面材接合部用縦枠5にボルト等により取り付ける。この後、図の左右の面材8を、上方より面材嵌合部2b, 4b, 5bおよび面材接合部用補助枠6に差込む。ついで上枠用補助枠7を取付ける。この後、各部のタッピンねじ20を止める。

このように構成したため、鋼製のパネル枠1と木製の面材8との接合部耐力が向上する。すなわち、面材8をねじ止めするものと異なり、ねじ孔が荷重の集中により破壊して面材縁部まで抜けて

しまうというようにならず、面材8の全周が面材嵌合部2b, 4b, 5bおよび各補助枠6, 7で支えられ、破壊することが防がれる。そのため、面材8の耐力が有効に利用され、パネルの面内せん断耐力が向上する。また、面材嵌合部2b, 4b, 5bおよび補助枠6, 7が設けられたことにより、枠材断面が大きくなり、これによって鉛直耐力も上がる。さらに、タッピンねじ20の打込みすぎも防ぐことができる。

第7図ないし第12図は他の実施例を示す。この例は、端部縦枠2'の面材嵌合部2'bおよび面材接合部用縦枠5'の面材嵌合部5'bを、L形断面形状の嵌合板10, 12と、平板状の押え板11, 13とで形成している。また、上枠3'および下枠4'を、溝形の本体部分3'aと溝形の面材嵌合部3'b, 4'bとで形成し、面材嵌合部3'b, 4'bを本体部分3'a, 4'aに一体に形成されたL形の嵌合板14, 16と平板状の押え板15, 17とで形成している。各押え板11, 13, 15, 17は面材8とともにタッピンねじ20で本体部分に固定される。

その他の構成は第1の実施例と同様である。

接合手順を説明する。まず、面材接合部補助枠6を面材接合部用縦枠5'に取り付ける。ついで、左右の面材8を正面より嵌め込む。この後、各押え板11, 13, 15, 17を面材8に当ててタッピンねじ20により止める。

このように構成した場合も、第1の実施例と同様に面内せん断耐力が向上し、かつ鉛直耐力も向上する。

なお、前記各実施例は片面のみに構造用面材8を取付けるようにしたが、パネル枠1を表裏とも同じような構造にして、両面に構造用面材8を取付けてもよい。

〔発明の効果〕

この発明の壁パネルは、面材の利用効率が良く、面内せん断耐力が向上するという効果がある。

4. 図面の簡単な説明

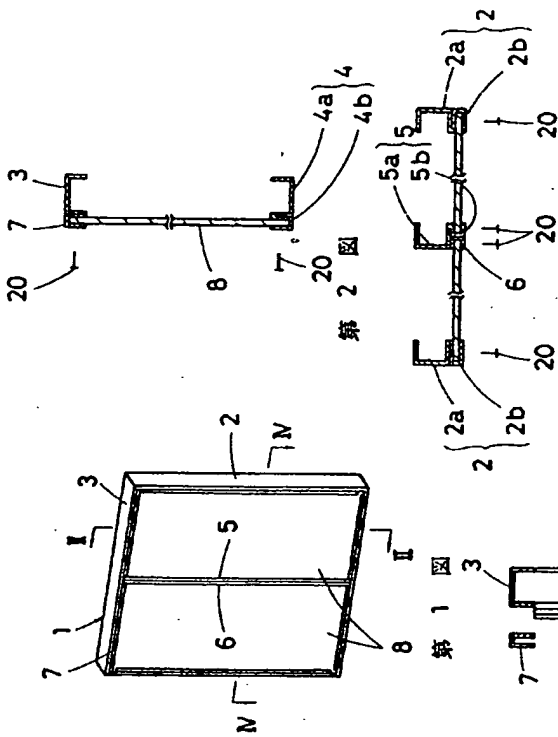
第1図はこの考案の一実施例の斜視図、第2図は第1図のⅠ-Ⅰ線断面図、第3図は第1図のⅡ-Ⅱ線断面図、第4図はそのパネル枠の斜視図、

第5図は第4図のV-V線断面図、第6図は第4図のVI-VI線断面図、第7図は他の実施例の斜視図、第8図は第7図のVII-VII線断面図、第9図は第7図のⅧ-Ⅷ線断面図、第10図はそのパネル枠の斜視図、第11図は第10図のⅨ-Ⅸ線断面図、第12図は第10図のⅩ-Ⅹ線断面図である。

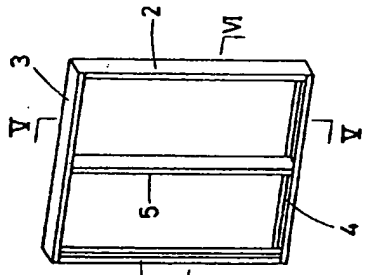
1…パネル枠、2, 2'…端部縦枠、2b, 2'b…面材嵌合部、3, 3'…上枠、4, 4'…下枠、4b, 4'b…面材嵌合部、5…面材接合部用縦枠、5b, 5'b…面材嵌合部、6…面材接合部用補助枠、7…上枠用補助枠

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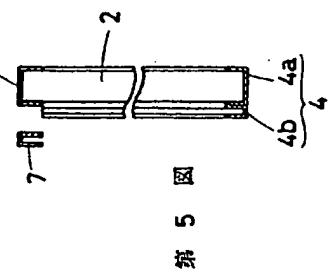
第 1 圖



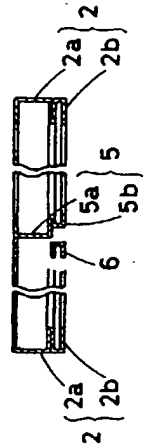
第 2 圖

第 3 圖

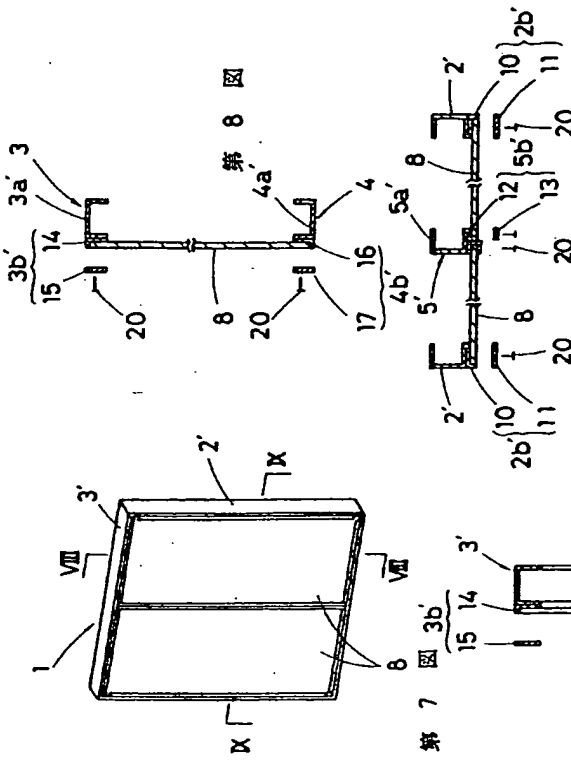
第 4 圖



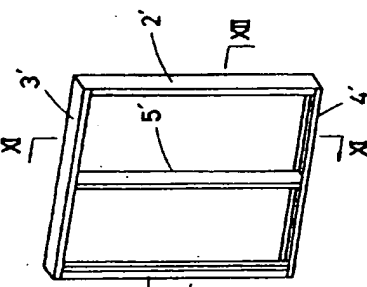
第 5 圖



第 6 圖



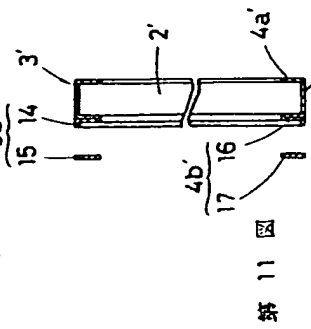
第 7 圖



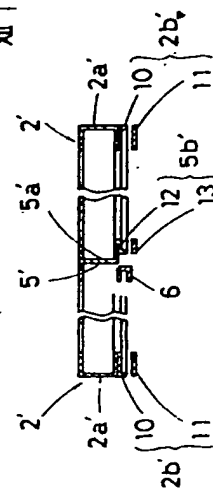
第 8 圖

第 9 圖

第 10 圖



第 11 圖



第 12 圖

JP-A-S60-85144

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Date of Publication: May 14, 1985

Application No. S58-192237

Date of Application: October 13, 1983

Inventors: Osami Yamada

Applicant: National Housing Industrial Co., Ltd.

Title of the Invention: WALL PANEL

Claims:

1. A wall panel comprising a panel frame provided with a surface member fitting portion having an inward groove shape at a whole periphery of side surfaces thereof, and a structural surface member in which a peripheral edge into said surface member fitting portion.

Brief Description of the Drawings:

Fig. 1 is a perspective view of one embodiment of the present invention, Fig. 2 is a sectional view taken along line II-II of Fig. 1, Fig. 3 is a sectional view taken along line III-III of Fig. 1, Fig. 4 is a perspective view of a panel frame thereof, Fig. 5 is a sectional view taken along a line V-V of Fig. 4, Fig. 6 is a sectional view taken along line VI-Vi of Fig. 4, Fig. 7 is a perspective view of another embodiment of the present invention, Fig. 8 is a sectional view taken along line VIII-VIII of Fig. 7, Fig. 9 is a sectional view taken along line IX-IX of Fig. 7, Fig. 10 is a perspective view of a panel frame thereof, Fig. 11 is a sectional view taken along XI-XI of Fig. 10, and Fig. 12 is a sectional view taken along line XII-XII of Fig. 10.

1 ... a panel frame, 2, 2' ... an end longitudinal frame, 2b, 2b' ... a surface member fitting portion, 3, 3' ... an upper frame, 4, 4' ... a lower frame, 4b, 4b' ... a surface member fitting portion, 5 ... a longitudinal frame for a surface member fitting portion, 5b, 5b' ... a surface member fitting portion, 6 ... an auxiliary frame for a surface member fitting portion, 7 ... an auxiliary frame for an upper frame.

Note:

If further translation is needed, please let us know.

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Examination request: NOT Requested, Number of inventions: 1, (total 3 pages<sup>1</sup>).

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(54) Title of the Invention: Wall Panel

(21) Application number: S58-192237  
(22) Date of filing: October 13, 1983

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SPECIFICATION

1. TITLE OF INVENTION  
Wall Panel

2. CLAIM

A wall panel, comprising:  
a panel frame provided with a surface member coupling portion having an inward groove shape on side surfaces on the entire periphery thereof; and  
a structural surface member, a peripheral edge thereof being coupled to the surface member coupling portion.

3. DETAILED EXPLANATION OF THE INVENTION  
(FIELD OF INDUSTRIAL APPLICATION)

The present invention relates to a wall panel that forms a load bearing wall.

(PRIOR ART)

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<sup>1</sup> Original document (including drawings) consists of 3 pages. Translated version has more pages due to formatting differences.

In the past, a steel panel frame with a wooden structural surface member extending thereon has been manufactured as a load bearing wall panel. However, the junction between the surface member and the panel frame is weak, and the in-plane shear capacity of the load bearing wall is determined by the bearing capacity at this location. Consequently, there were problems of breakage occurring before the maximum bearing capacity of the panel frame or the surface member was reached, and of a low utilization efficiency of materials.

#### (OBJECT OF THE INVENTION)

An object of the present invention is to boost the utilization efficiency of materials and to provide a wall panel capable of increasing the in-plane shear capacity.

#### (DISCLOSURE OF THE INVENTION)

In the wall panel of the present invention, a surface member coupling portion having an inward groove shape is provided on side surfaces of the panel frame, and the peripheral edges of a surface member are coupled thereto.

One embodiment of the present invention is shown in FIGS. 1 to 6. In these drawings, reference numeral 1 denotes a steel panel frame, and the frame is assembled into a square shape from a pair of end portion longitudinal frames 2, an upper frame 3 and a lower frame 4, and a longitudinal frame 5 for the surface member junction is provided midway therein. The end portion longitudinal frames 2 are comprised of a main body portion 2a having an inward groove shape, and a surface member coupling portion 2b having an inward groove shape and being provided so as to overlap the outer surface of the flange thereof. The main body portion 2a and the surface member coupling portion 2b are formed integrally and continuously at the tip of the overlapping flange. The longitudinal frame 5 for the surface member junction is comprised of a groove-shaped main body portion 5a and a shallow surface member coupling portion 5b, provided integrally in the same direction as the main body portion 5a and overlapping the outer surface of the flange. An auxiliary frame 6 for a separate surface member junction, constituting another surface member coupling portion, is attached back-to-back with the surface member coupling portion 5b. The upper frame 3 is formed with a downward groove shape, and an auxiliary frame 7 for the upper frame, constituting the surface member coupling portion, is attached to the side surfaces thereof. Similar to the end portion longitudinal frames 2, the lower frame 4 is comprised of a main body portion 4a and a surface member coupling portion 4b.

Surface members 8 are wooden structural surface members, the peripheral edges thereof being coupled to the surface member coupling portions 2b, 4b and 5b, the auxiliary frame 7 for the upper frame, and the auxiliary frame 6 for the surface member junction, and are fastened to each of the frames 2 to 5 with tapping screws 20 inserted from above.

The assembly sequence is described below. First, the auxiliary frame 6 for the surface member junction is attached to the longitudinal frame 5 for the surface member junction with a bolt or the like. Then, the left and right surface members 8 in the drawings are inserted from above into the surface member coupling portions 2b, 4b and 5b, and the auxiliary frame 6 for the surface member junction. Next, the auxiliary frame 7 for the upper frame is attached. Then, the tapping screws 20 of each portion are tightened.

As a result of this type of configuration, the bearing capacity of the junction between the steel panel frame 1 and the wooden surface members 8 is improved. In other words, in contrast to a configuration in which the surface members 8 are fastened with screws, the concentration of load does not cause screw holes to break and fall away up to the edge of the surface member, and instead, breakage is prevented as the entire periphery of the surface member 8 is supported by surface member coupling portions 2b, 4b and 5b, and auxiliary frames 6 and 7. As a result, the bearing capacity of the surface members 8 is utilized efficiently, and the in-plane shear capacity

of the panel is improved. Moreover, the cross-sectional area of the frame members is larger due to the provision of surface member coupling portions 2b, 4b and 5b, and auxiliary frames 6 and 7, and consequently, the vertical bearing capacity is increased. Additionally, overdriving of the tapping screw 20 can be prevented.

FIGS. 7 to 12 show another embodiment. In this embodiment, surface member coupling portions 2b' of end portion longitudinal frames 2' and a surface member coupling portion 5b' of a longitudinal frame 5' for the surface member junction are formed with coupling plates 10 and 12 having an L-shaped cross-sectional profile, and flat retainer plates 11 and 13. Moreover, an upper frame 3' and a lower frame 4' are formed with a groove-shaped main body portion 3a' and groove-shaped surface member coupling portions 3b' and 4b', and surface member coupling portions 3b' and 4b' are formed with L-shaped coupling plates 14 and 16 formed integrally with main body portions 3a' and 4a', and with flat retainer plates 15 and 17. The retainer plates 11, 14, 15 and 17 are fastened, together with the surface member 8, to the main body portion with tapping screws 20. Other configurations are similar to those of the first embodiment.

The joining procedure is described below. First, the auxiliary frame 6 for the surface member junction is attached to the longitudinal frame 5' for the surface member junction. Next, left and right surface members 8 are inlaid from the front side. Then, retainer plates 11, 13, 15 and 17 are pressed against surface members 8 and fastened with tapping screws 20.

With this type of configuration, as in the first embodiment, the in-plane shear capacity increases and the vertical bearing capacity also increases.

Furthermore, in the aforementioned embodiments, the structural surface member 8 was attached on one side only, but by providing the panel frame 1 with the same structure on both its front and back, structural surface members 8 may be attached on both sides.

#### (EFFECT OF THE INVENTION)

The wall panel of the present invention has the effects of good utilization efficiency of the surface members, and of increased in-plane shear capacity.

#### 4. BRIEF EXPLANATION OF THE DRAWINGS

FIG. 1 is a perspective view of one embodiment of the present invention; FIG. 2 is a cross-sectional view taken along line II-II of FIG. 1; FIG. 3 is a cross-sectional view taken along line IV-IV of FIG. 1; FIG. 4 is a perspective view of a panel frame thereof; FIG. 5 is a cross-sectional view of line V-V of FIG. 4; FIG. 6 is a cross-sectional view of line VI-VI of FIG. 4; FIG. 7 is a perspective view of another embodiment; FIG. 8 is a cross-sectional view of line VIII-VIII of FIG. 7; FIG. 9 is a cross-sectional view of line IX-IX of FIG. 7; FIG. 10 is a perspective view of a panel frame thereof; FIG. 11 is a cross-sectional view of line XI-XI of FIG. 10; and FIG. 12 is a cross-sectional view of line XII-XII of FIG. 10.

- 1 ... panel frame
- 2, 2' ... end portion longitudinal frame
- 2b, 2b' ... surface member coupling portion
- 3, 3' ... upper frame
- 4, 4' ... lower frame
- 4b, 4b' ... surface member coupling portion
- 5 ... longitudinal frame for the surface member junction
- 5b, 5b' ... surface member coupling portion
- 6 ... auxiliary frame for the surface member junction
- 7 ... auxiliary frame for the upper frame

Representative: Akio MIYAI, Patent Attorney [seal: Akio MIYAI]